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(56) Documents Cited  
EP 0405159 A  
US 5226259 A

US 5581952 A

US 5308129 A

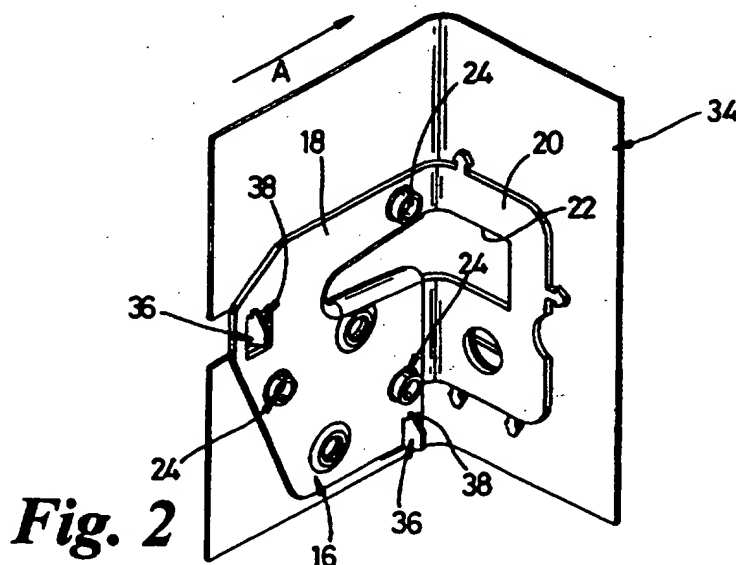
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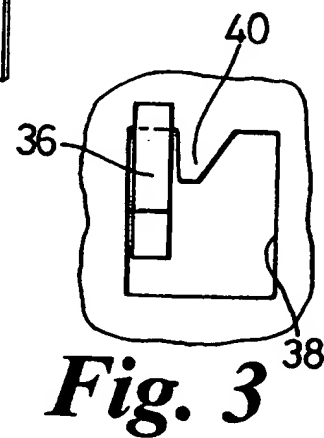
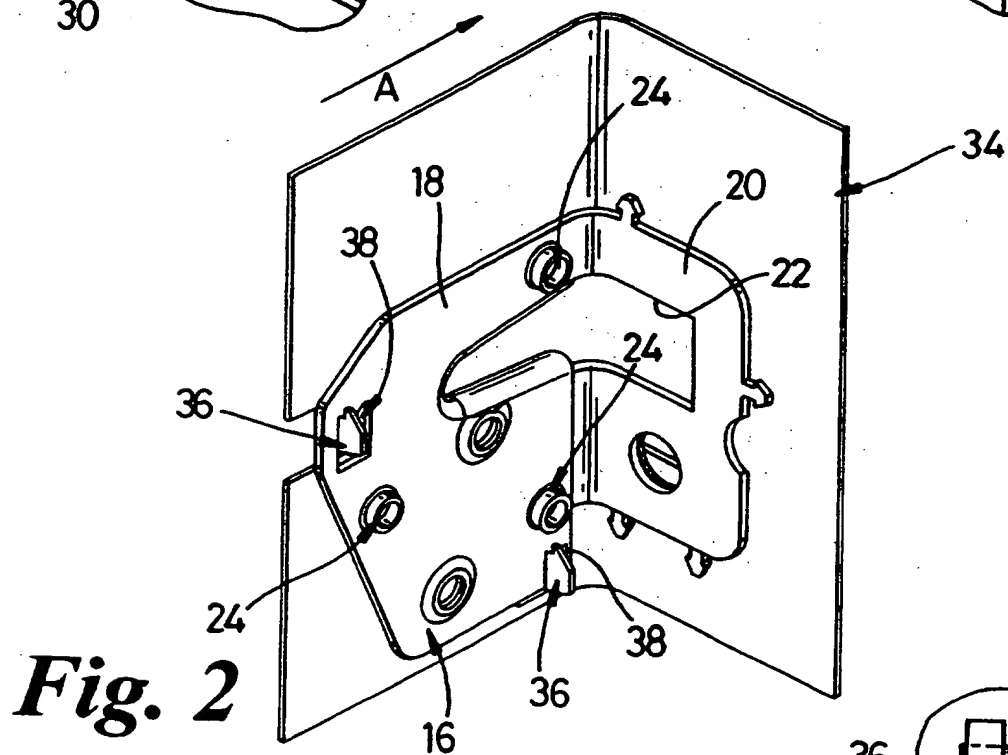
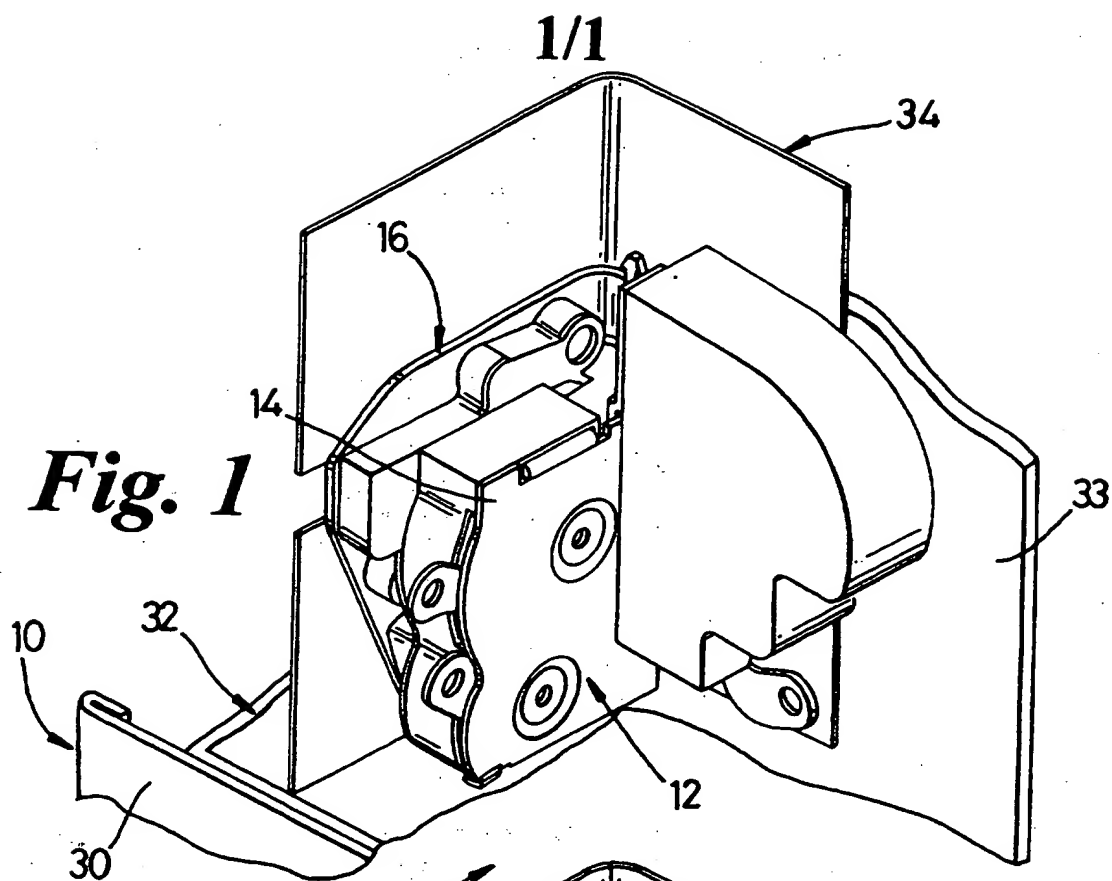
Vehicle door assembly

(57) Vehicle door assembly has a unitary preassembled mechanism secured by engaging a mounting plate 16 onto the related part 34 of the door structure. One of said plate and part includes one or more eye formations 38 which mate with one or more hook formations 36 of the other of the plate and part to hold the mechanism in its correct alignment ready for the insertion and securing of fixing elements. Said formation may include provision for relative sliding of the mechanism to its final position, eg to compress a weather seal, and ratchet teeth to hold the mechanism in said position ready to receive the fixing elements.



**Fig. 2**

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**VEHICLE DOOR ASSEMBLY**

This invention relates to vehicle door assemblies and methods for their assembly, particularly but not exclusively relative to doors for passenger vehicles. The term "door" used herein comprises not only the doors for entry to the vehicle of the driver and/or passengers but other body access closures such as boot or trunk lids, tailgates or bonnets.

The objection of the invention is to provide improvements in door assemblies and, in particular, facilitate the final assembly process by saving time and labour at that stage.

According to one aspect of the invention there is provided a vehicle door assembly comprising a door structure having an outer skin with a flanged frame element extending inwardly from an edge part with or without an inner facing panel so defining a door recess or cavity, and a unitary operating mechanism pre-assembled on a mounting member and operatively secured within the recess or cavity by one or more fixing elements inserted through the door structure into said member; characterised in that one of the door structure and said member is provided with an eye formation and the other of said structure and member is provided with a mating hook formation, inter-engagement of said formations on insertion of the mechanism into the recess or cavity holding the member in correct alignment with the structure for ready insertion and securing of the fixing element or elements.

Preferably there are at least 2 sets of inter-engaging eye and hook formations for positive alignment of the member and structure.

Conveniently, the or each hook is a notched tab bent to project from a face of the member or structure to be received in a complimentary eye being a slot or edge notch cut out from or formed in the other of the structure or member.

The eye or eyes may be shaped to permit face-to-face sliding displacement of the mechanism relative to the structure to the final position of alignment after the hook or hooks have entered the eye or eyes. Such sliding displacement may serve to compress a weather seal between an end face of the of the mechanism and the door structure. If this sliding displacement is provided for, the or each set of inter-engaging formations will preferably include a ratchet tooth or the like permitting said sliding displacement but resisting return movement so that the mechanism is positively held in alignment, with any such weather seals compressed, ready for insertion and securing of the fixing element or elements.

It will be appreciated that various forms of inter-engaging formations may be used, for example a hook in the form of a headed stud co-acting with an eye in the form of a key hole or bayonet slot.

According to another aspect the invention provides a method of assembling a vehicle door assembly including the steps of providing a door structure and a unitary operating mechanism as above defined, presenting the mechanism to the door structure to bring the respective formations into mating relationship and engaging them together as above referred to, and inserting and securing the fixing element or elements while the mechanism and the door structure are held in alignment by the engaged formations to complete the assembly thereof.

An example of the invention is now more particularly described with reference to the accompanying drawings wherein;

Figure 1 is a perspective view of part of a completed vehicle door assembly incorporating the invention,

Figure 2 is a perspective view of a reinforcement panel of structure of the door and a retention plate of latch mechanism of the door in assembled relationship, and

Figure 3 is a detail of inter-engaging formations of said panel and plate.

A vehicle driver's or passenger door comprises a door structure 10 of generally conventional construction and show only in small part in figure 1, and a unitary latch and locking mechanism 12, again of generally conventional construction and substantially enclosed by a housing 14 locating and containing the components of the mechanism. Housing 14 is attached to a mounting member in the form of a heavy gauge metal retention plate 16 of the mechanism, which plate also supports said components.

Plate 16 is L-shaped in plan as best seen in figure 2 comprising a major generally planar side part 18 and a lesser generally planar front part 20 at right angles to part 18. A cut out 22 through the corner so formed and extending part way along both parts 18, 20 receives a door post striker (not shown) which is engaged in conventional manner by a latch claw (not shown) of mechanism 12 to secure the door in closed condition.

Side part 18 has tapped bores 24 for receiving fixing screws (not shown).

Door structure 10 is the usual pressed metal fabrication including an outer skin 30 carried on a flanged frame element 32 which, at the edge part of the door shown in figure 1, extends inwardly of skin 30 and terminates in a return flange 33 in spaced parallel relationship to skin 30 to form a door recess

or cavity. A trim panel or other inner skin is usually mounted on the return flange to close the inner side of the door.

Mechanism 12 has to be positioned and secured within this recess or cavity in the corner defined in part said return flange. This part of the frame element 32 is provided with a right angled heavier gauge reinforcement plate 34 to carry and distribute the forces applied to and through mechanism 12. Plate 34 and frame element 32 have cut-outs matching cut-out 22 of retention plate 16 and a compressible weather seal (not shown) is preferably provided around said cut-out sandwiched between retention plate 16 and reinforcement plate 34.

To secure mechanism 12 in position it is necessary to align bores 24 accurately with the corresponding through bores in door frame element 32, involving keeping the mechanism shifted rightwards in the direction of arrow A as well as holding it in the corner of the door recess for insertion of fixing screws from the outside of frame element 32 to engage them with bores 24.

With conventional constructions where the fixing screws are the only means of securing such alignment this final assembly process is often troublesome, time consuming, and labour intensive, maybe necessitating the services of an assistant to hold the mechanism in place and shift it about while another operative inserts and tightens the fixing screws from the outside.

In the described example reinforcement plate 34 includes a pair of hook formations in the form of tabs 36 (figure 2) formed by folding edge parts of the panel to project inwardly, the upper edges of the tabs being notched to form hooks and the upper outer corners being bevelled to provide a lead in



facilitating hook engagement.

The major side part 18 of retention plate 16 is formed with a pair of eye formations in the form of slots 38 punched out of the plate at positions complimentary to the positioning of tabs 36. Slots 38 extend longitudinally of part 18, ie they are wider than the thickness of tabs 36 permitting lateral sliding movement of mechanism 12 after tabs 36 have been entered in said slots. The upper edge bounding each slot is provided with a generally central downwardly directed ratchet tooth 40 (Figure 3) which will ride over the mating tab 36 as plate 18 is shifted to the right as viewed in the drawings but which will resist return movement.

It will be seen that the inter-engaging formations thus formed permit ready engagement of the mechanism 12 within the door structure and positive alignment holding the mechanism in place with any weather sealing compressed by a simple operation, the mechanism 12 then being held without further aid in its correct position and alignment so that assembly is completed by simply inserting the fixing screws from the outside. The inter-engaging tab and slot formations 36, 38 also strengthen the completed assembly, even if the fixing screws become loose the alignment will not be lost and the formations share the loading and distribute it in company with the fixing screws. It is possible that less fixing screws or other fixing elements may be required when the invention is used, thus effecting further saving in manufacturing and assembly costs.

**CLAIMS**

1. A vehicle door assembly comprising a door structure having an outer skin with a flanged frame element extending inwardly from an edge part with or without an inner facing panel so defining a door recess or cavity, and a unitary operating mechanism pre-assembled to include a mounting member and operatively secured within the recess or cavity by one or more fixing elements inserted through the door structure into said member; characterised in that one of the door structure and said member is provided with an eye formation and the other of said structure and member is provided with a mating hook formation, inter-engagement of said formations on insertion of the mechanism into the recess or cavity holding the member in correct alignment with the structure for ready insertion and securing of the fixing element or elements.

2. An assembly as in claim 1 wherein there are at least two sets of inter-engaging eye and hook formations for positive alignment of the member and structure.

3. An assembly as in claim 1 or 2 wherein the or each hook is a notched tab bent to project from a face of the member or structure to be received in a complimentary eye being a slot or edge notch cut out from or formed in the other of the structure or member.

4. An assembly as in claim 1, 2 or 3 wherein the eye or eyes are shaped to permit face-to-face sliding displacement of the mechanism relative to the structure to the final position of alignment after the hook or hooks have entered the eye or eyes.

5. An assembly as in claim 4 wherein said sliding displacement serves to compress a weather seal between an end face of the mechanism and the door structure.

6. An assembly as in claim 4 or 5 wherein the or each set of inter-engaging formations includes a ratchet tooth or the like permitting said sliding displacement but resisting return movement so that the mechanism is positively held in alignment ready for insertion and securing of the fixing element or elements.

7. An assembly as in claim 1 wherein the hook formation is a headed stud co-acting with an eye formation in the form of a key hole or bayonet slot.

8. A vehicle door assembly substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

9. A method of assembling a vehicle door assembly including the steps of providing a door structure and a unitary operating mechanism as defined in any one of the preceding claims, presenting the mechanism to the door structure to bring the respective formations into mating relationship and interengagement and inserting and securing the fixing element or elements while the mechanism and the door structure are held in alignment by the engaged formations to complete the assembly thereof.



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**Claims searched:** 1-9

**Examiner:** Jason Clee  
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**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): EIJ: JCH, JDH & JGS

Int Cl (Ed.6): B60J: 5/00, 5/02, 5/04, 5/06, 5/08, 5/10, 5/12, 5/14. B62D: 25/10, 25/12

Other: Online: WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	EP 0405159 A1 (Brose Fahrzeugteile GmbH & Co.) esp. see figs 5 & 11	1, 2, 4, 7 & 9
X	US 5581952 A (Chrysler Corporation) esp. see figs and col. 1 l. 30-45	1, 2, 4, 7 & 9
X	US 5308129 A (General Motors Corporation) esp see fig 2	1, 3, 4 & 9
X	US 5226259 A (Nissan Motor Co. Ltd) esp. see figs 10 & 11	1-4 & 9

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